

IN THE CLAIMS:

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Examiner Jiang and the undersigned counsel discussed the Examiner's Office Action in a telephone interview on December \_\_\_\_, 2004. In the Office Action the Examiner stated that the dependent Claim 5 was determined to be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 1,2,3,12 and 13 were rejected pursuant to 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S. C. §103(a) as obvious over *Kushnir*. (WO 99/44552 - U.S. Pat. No. 6,508,831). Claims 1,2,3,11,12, 13 and 20 were rejected pursuant to 35 U.S.C. §102(b), as anticipated by *Rose et al.* (U.S. Pat. No. 5,755,275). Claims 1,4,9,10 and 13 were also rejected pursuant to 35 U.S.C. §102(b), as anticipated by, or in the alternative, under 35 U.S. C. §103(a) as obvious over *Abadilla et al.* (U.S. Pat. No. 5,564,276). Claims 11 and 20 were also rejected pursuant to 35 U.S.C. §103(a) as unpatentable over *Kushnir*. (WO 99/44552 - U.S. Pat. No. 6,508,831) in view of *Bares et al.* (US 5,092,129) and *Frantti* (US 3,085,405). Pursuant to the Examiner's comments Claim 1 has been amended to include the limitations set forth in the allowable Claim 5. Claim 5, being rendered redundant by including the limitations therein in the base claim (Claim 1), is hereby canceled. Since all the Claims are dependent upon the newly amended and now allowable Claim 1 the previously withdrawn Claims 6-8 and 14-19 are re-presented as allowable species that depend upon a generic claim (Claim 1). In the telephone interview with the Examiner it was indicated that so long as the amendment was responsive with the Office Action discussion, then these claims as amended would be allowable. Hence the Claims have been amended as follows:

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IN THE CLAIMS

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CLAIMS

1. (currently amended): A personal cooling and heating system comprised of:

a vest;

at least one temperature sensor;

a temperature transfer medium contained by the vest;

a cooling unit;

a heating unit;

a temperature transfer medium transport means;

the temperature transfer medium transport means being capable of transporting the temperature transfer medium from the vest into the cooling unit where the temperature transfer medium may be cooled by one or more cooling means and then once cooled the temperature transfer medium is transported back to the vest by the temperature transfer medium transport means;

the temperature transfer medium transport means being capable of transporting the temperature transfer medium from the vest into the heating unit where the temperature transfer medium may be heated by one or more heating means and then once heated the temperature transfer medium is transported back to the vest by the temperature transfer medium transport means;

the heating means being comprised of:

at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature;

a user adjustable electronic controller electrically attached to the temperature transfer medium transport means, the cooling means and the heating means;

the user adjustable electronic controller is electronically connected to the temperature sensor wherein the user adjustable electronic controller automatically and electrically activates the temperature transfer medium transport means when the temperature sensor electronically communicates to the user adjustable electronic controller that the vest is at a temperature that is different than that of a user selected temperature setting on the user adjustable electronic controller thus causing the temperature transfer medium to be transported from the vest;

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the user adjustable electronic controller automatically and electrically activates only the cooling means when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature thus causing the temperature transfer medium that has been transported from the vest to be cooled by the cooling means before being transported back to the vest by the temperature transfer medium transport means;

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the user adjustable electronic controller automatically and electrically activates only the heating means when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature thus causing the temperature transfer medium that has been transported from the vest to be heated by the heating means before being transported back to the vest by the temperature transfer medium transport means; and

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a power supply means electrically attached to the adjustable electronic controller to provide the electrical power necessary for the adjustable electronic controller in communication with the temperature sensor to activate the temperature transfer medium transport means, and either the cooling means or the heating means.

2. (original): The personal cooling and heating system of CLAIM 1 wherein the temperature transfer medium is water.

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3. (original): The personal cooling and heating system of CLAIM 1 wherein the vest is further comprised of a flexible channel means capable of circulating therein the temperature transfer medium.

4. (original): The personal cooling and heating system of CLAIM 1 wherein the cooling means is comprised of:

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at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

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the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side

becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

at least one vest loop liquid heat exchanger attached to the temperature transfer medium transport means wherein when the temperature transfer medium transport means is activated the temperature transfer medium is pumped from the vest through the vest loop liquid heat exchanger and back to the vest;

the vest loop liquid heat exchanger having a front side and a back side either or both of which is formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the temperature transfer medium makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when pumped through the vest loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the temperature transfer medium;

at least one air heat exchanger;

the air heat exchanger having at least one cooling liquid channel therein;

a cooling liquid contained in the air heat exchanger cooling liquid channel;

the air heat exchanger having at least one air channel there through;

at least one air heat exchanger fan attached to the air heat exchanger;

at least one cooling loop liquid heat exchanger;

at least one cooling loop pump means capable of pumping the cooling liquid from the cooling loop liquid heat exchanger to and through the air heat exchanger cooling liquid channel and then back to the cooling loop liquid heat exchanger;

the cooling loop pump means being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature

the cooling loop liquid heat exchanger having a cooling front side and a cooling back side either or both of which are formed by the electrically reversible hot side of the reversible thermoelectric cooler module, the electrically reversible cold side of which is used to form either or both of the front side or the back side of the vest loop liquid heat exchanger, such that the cooling liquid makes direct contact with the electrically reversible hot side of the reversible thermoelectric cooler module when pumped through the cooling loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature; and

the air heat exchanger fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature by electrically activating the air heat exchanger fan which blows ambient air through the air channel of the air heat exchanger that has been heated by the circulating of the cooling liquid therein and then discharging the now heated blown ambient air into the surrounding ambient air.

5. (canceled): The personal cooling and heating system of ~~CLAIM 4~~ wherein the heating means is comprised of:

~~at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature~~

6. (re-presented - formerly withdrawn): The personal cooling and heating system of **CLAIM 1** wherein the cooling means is ice.

7. (re-presented - formerly withdrawn): The personal cooling and heating system of **CLAIM 1** wherein the cooling means is a refrigerant gas.

8. (re-presented - formerly withdrawn): The personal cooling and heating system of **CLAIM 1** wherein the heating means is the combustion of a fuel.

9. (original): The personal cooling and heating system of **CLAIM 4** wherein the reversible thermoelectric cooler module is at least one Peltier device.

10. (original): The personal cooling and heating system of **CLAIM 4** wherein the reversible thermoelectric cooler module is comprised of at least one Bismuth Telluride cube sandwiched between two ceramic plates.

11. (original): The personal cooling and heating system of CLAIM 1 wherein the cooling unit, the cooling means, the heating unit, the heating means, the temperature transfer medium transport means and the power supply are attached to a carrier capable of being worn by a user thereby making the personal cooling and heating system portable.

12. (original): The personal cooling and heating system of CLAIM 1 wherein the temperature transfer medium transport means is functionally connected to the vest with a self sealing quick disconnect coupling.

13. (original): The personal cooling and heating system of CLAIM 1 wherein the cooling unit, the cooling means, the heating unit, the heating means, the temperature transfer medium transport means, the power supply and the temperature sensor are all controlled by and in communication with the user adjustable electronic controller by wireless means.

14. (re-presented - formerly withdrawn): The personal cooling and heating system of CLAIM 1 wherein the cooling means is comprised of:

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

at least one vest loop liquid heat exchanger attached to the temperature transfer medium transport means wherein when the temperature transfer medium transport means is activated the temperature transfer medium is pumped from the vest through the vest loop liquid heat exchanger and back to the vest;

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the vest loop liquid heat exchanger having a front side and a back side either or both of which is formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the temperature transfer medium makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when pumped through the vest loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the temperature transfer medium;

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at least one cooling fin attached to the electrically reversible hot side of the reversible thermoelectric cooler module when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature; and

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at least one cooling fin fan that is electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature thereby blowing ambient air over the cooling fin drawing heat therefrom and then discharging the now heated blown ambient air into the surrounding ambient;

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15. (re-presented - formerly withdrawn): The personal cooling and heating system of CLAIM 1 wherein the vest is comprised of:

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at least one liquid pack;

the liquid pack having a liquid pack fluid contained therein;

the liquid pack having a liquid pack cold side and a liquid pack hot side;

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically

reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

the liquid pack hot side of the liquid pack being formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the liquid pack fluid makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the liquid pack fluid; and

the cooling means of the personal cooling and heating system of CLAIM 1 being further comprised of:

at least one air heat exchanger;

the air heat exchanger having at least one air channel there through;

at least one air heat exchanger fan attached to the air heat exchanger;

at least one cooling loop liquid heat exchanger;

at least one cooling loop pump means capable of pumping the cooling liquid from the cooling loop liquid heat exchanger to and through the air heat exchanger cooling liquid channel and then back to the cooling loop liquid heat exchanger;

the cooling loop pump means being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature;

the cooling loop liquid heat exchanger having a cooling front side and a cooling back side either or both of which are formed by the electrically reversible hot side of the reversible



thermoelectric cooler module, the electrically reversible cold side of which is used to form the liquid pack hot side of the liquid pack, such that the cooling liquid makes direct contact with the electrically reversible hot side of the reversible thermoelectric cooler module when pumped through the cooling loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature; and

the air heat exchanger fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature by electrically activating the air heat exchanger fan which flows ambient air through the air channel of the air heat exchanger that has been heated by the circulating of the cooling liquid therein and then discharging the now heated blown ambient air into the surrounding ambient air.

16. (re-presented - formerly withdrawn): The personal cooling and heating system of CLAIM 15 wherein the heating means is comprised of:

at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature.

17. (re-presented - formerly withdrawn): The personal cooling and heating system of CLAIM 1 wherein:

the vest is further comprised of at least one vest air channel attached thereto;  
the vest air channel having an input end and an output end;  
at least one vest exhaust duct attached to the vest air channel output end;  
at least one vest intake duct attached to the vest air channel input end;  
at least one vest air cooler and condenser attached to the vest exhaust duct;  
at least one vest air fan capable of conveying air from the vest through the vest air channel, then through the output end, then through the vest exhaust duct then through the air cooler and condenser, then through the vest intake duct and then through the input end;  
the vest air fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature;

the vest air cooler and condenser having at least one condensing coil over which the conveyed air passes when the vest air fan is activated;

the vest air cooler and condenser having at least one waste condensed fluid pump capable of pumping any waste condensed fluid that may be condensed from the conveyed air being passed over the vest air cooler and condenser;

a condenser fluid contained in the condensing coil;

at least one reversible thermoelectric cooler module electrically attached to and activated by a reversible direct current of electricity that is pulsed from the user adjustable electronic controller in one direction when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller;

the reversible thermoelectric cooler module having an electrically reversible hot side and an electrically reversible cold side which is reversed by the user adjustable electronic controller reversing the direction of the pulsed reversible direct current such that the electrically reversible hot side becomes the electrically reversible cold side and the electrically reversible cold side becomes the electrically reversible hot side;

at least one condenser loop liquid heat exchanger;

at least one condenser fluid pump attached to the condenser loop liquid heat exchanger;

the condenser fluid pump being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature such that when the condenser fluid pump is activated the condenser fluid is pumped from the condensing coil through the condenser loop liquid heat exchanger and then back to the condensing coil;

the condenser loop liquid heat exchanger having a front side and a back side either or both of which is formed by the electrically reversible cold side of the reversible thermoelectric cooler module such that the condenser fluid makes direct contact with the electrically reversible cold side of the reversible thermoelectric cooler module when pumped through the condenser loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that

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the temperature of the vest is higher than the user selected temperature and in the event that the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature the user adjustable electronic controller automatically reverses the direction of the reversible direct current of electricity that is pulsed from the user adjustable electronic controller such that the electrically reversible cold side of the reversible thermoelectric cooler module becomes the electrically reversible hot side of the reversible thermoelectric cooler module which remains in direct contact with the condenser fluid;

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at least one air heat exchanger;

the air heat exchanger having at least one cooling liquid channel therein;

a cooling liquid contained in the air heat exchanger cooling liquid channel;

the air heat exchanger having at least one air channel there through;

at least one air heat exchanger fan attached to the air heat exchanger;

at least one cooling loop liquid heat exchanger;

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at least one cooling loop pump means capable of pumping the cooling liquid from the cooling loop liquid heat exchanger to and through the air heat exchanger cooling liquid channel and then back to the cooling loop liquid heat exchanger;

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the cooling loop pump means being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature

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the cooling loop liquid heat exchanger having a cooling front side and a cooling back side either or both of which are formed by the electrically reversible hot side of the reversible thermoelectric cooler module, the electrically reversible cold side of which is used to form either or both of the front side or the back side of the condenser loop liquid heat exchanger, such that the cooling liquid makes direct contact with the electrically reversible hot side of the reversible thermoelectric cooler module when pumped through the cooling loop liquid heat exchanger when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature; and

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the air heat exchanger fan being electrically attached to and activated by the user adjustable electronic controller when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is higher than the user selected temperature by electrically activating the air heat exchanger fan which flows ambient air through the air channel of the

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air heat exchanger that has been heated by the circulating of the cooling liquid therein and then discharging the now heated blown ambient air into the surrounding ambient air.

18. (re-presented - formerly withdrawn): The personal cooling and heating system of **CLAIM 17** wherein the vest, the vest air cooler and condenser, the vest air fan, the vest intake duct and the vest exhaust duct are contained in a protective suit capable of being worn by a user wherein the intake duct discharges the conveyed air that was passed over the vest air cooler and condenser into the protective suit which conveyed air in turn is drawn into the input end of the vest air channel by the action of the vest air fan.

19. (re-presented - formerly withdrawn): The personal cooling and heating system of **CLAIM 16** wherein the heating means is comprised of:

at least one electric heating strip attached to the electrically reversible cold side of the reversible thermoelectric cooler module which is the electrically reversible cold side when the temperature sensor communicates to the user adjustable electronic controller that the temperature of the vest is lower than the user selected temperature.

20. (currently amended): A personal cooling and heating system according to **CLAIMS 2,3,4,5,6,7,8,9,10, 12,13,14,15,16,17,18 or 19** in which the cooling unit, the cooling means, the heating unit, the heating means, the temperature transfer medium transport means and the power supply are attached to a carrier capable of being worn by a user thereby making the personal cooling and heating system portable.